

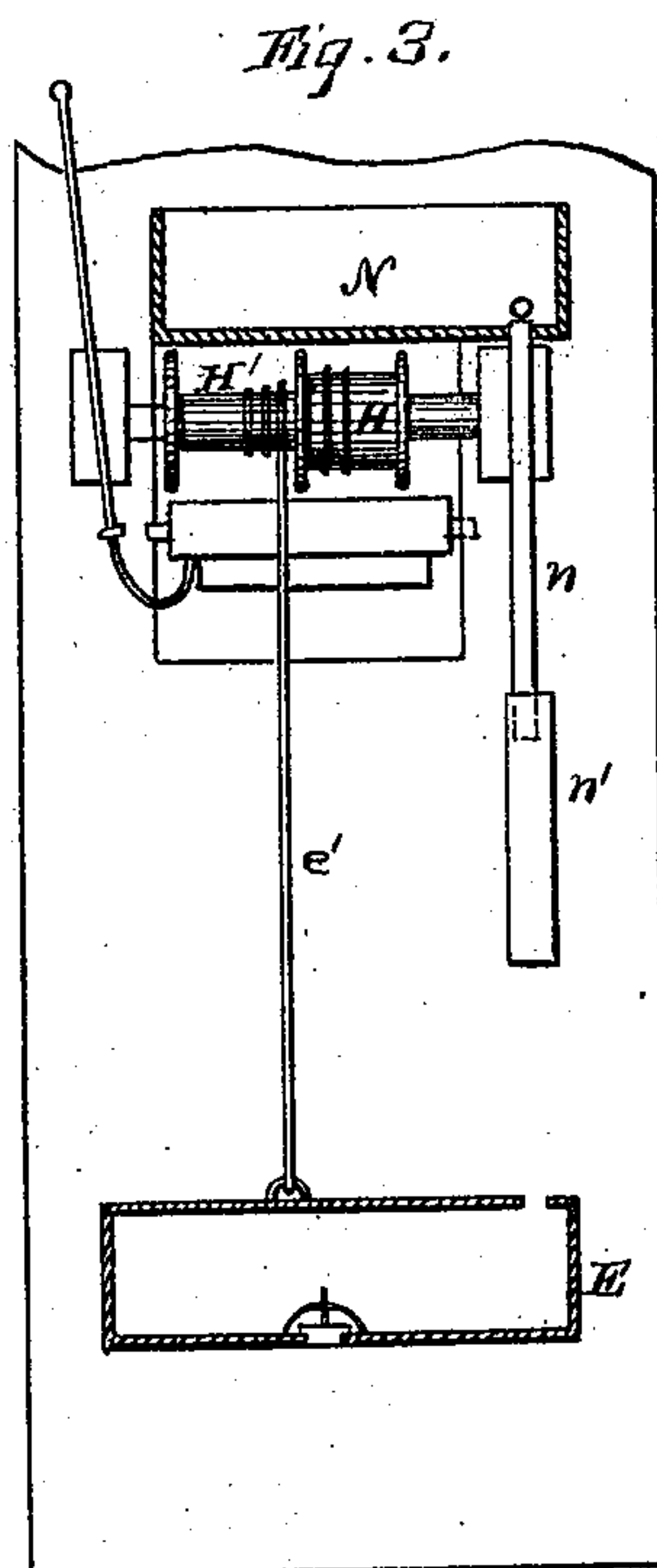
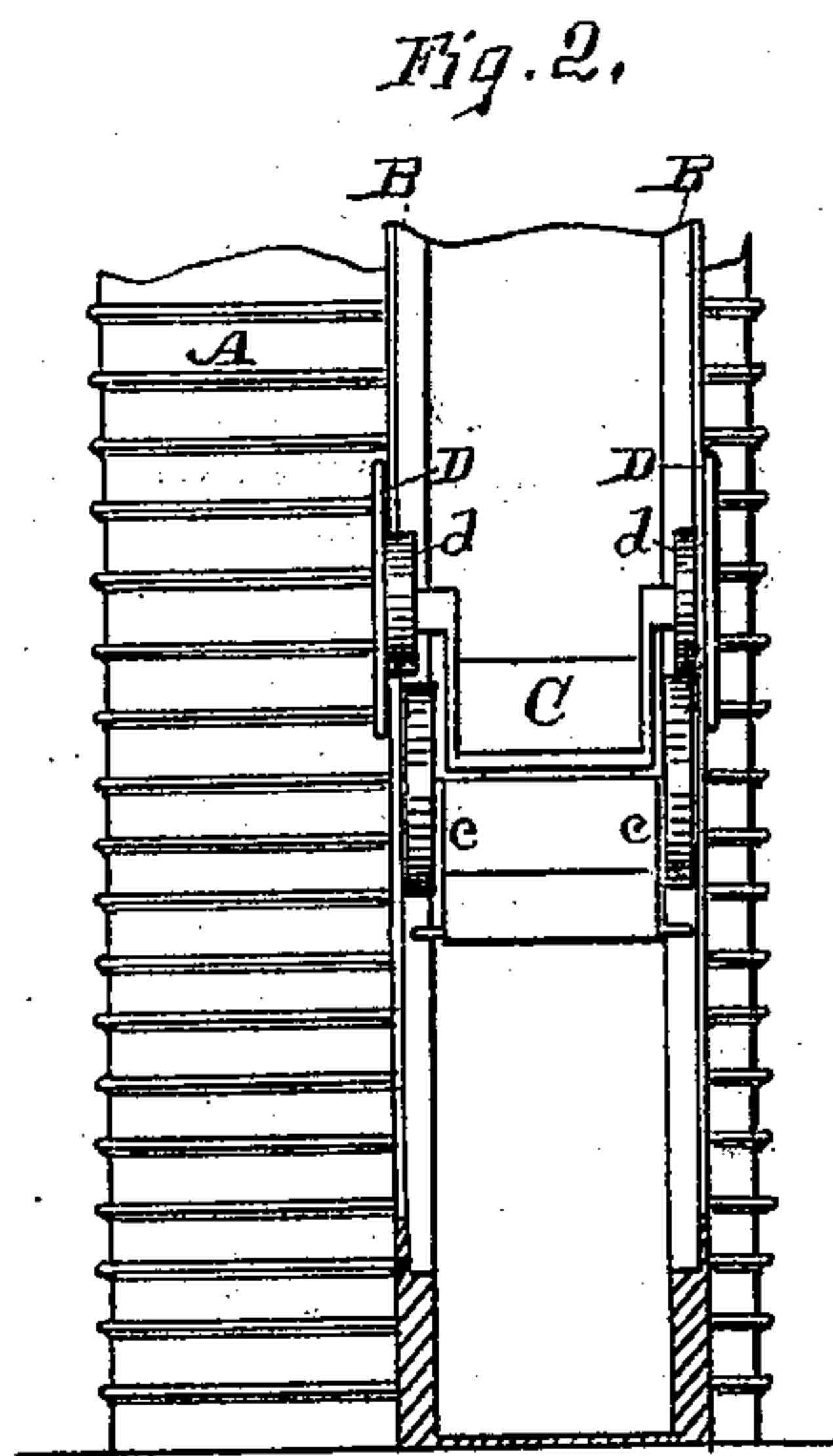
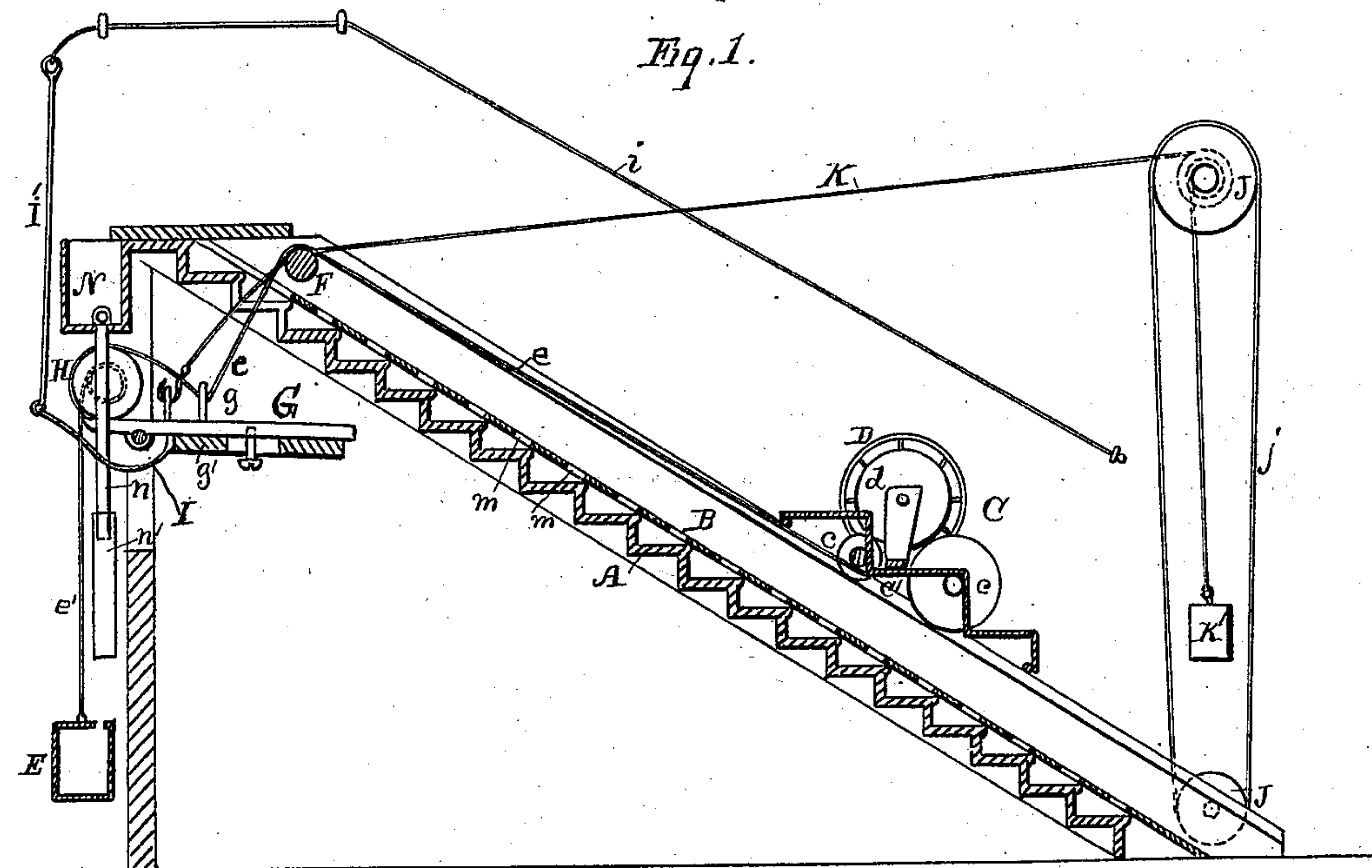
(No Model.)

2 Sheets—Sheet 1.

J. I. TAY.
Stairway-Elevator.

No. 227,459.

Patented May 11, 1880.



Witnesses

Frank A. Brooks
Geo. H. Strong.

Inventor

John I. Tay
By Dewey & Co
Attys

(No Model.)

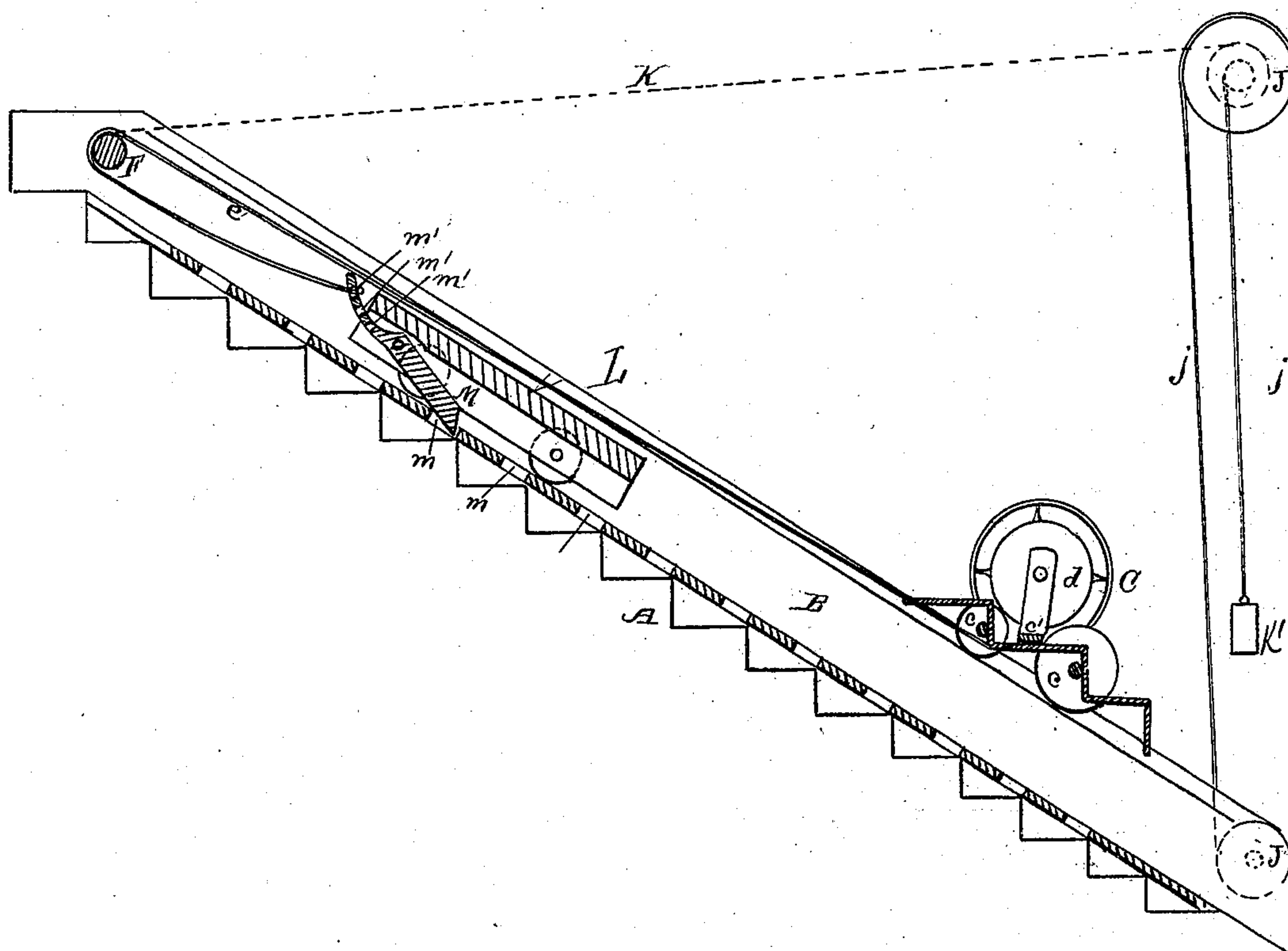
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Fig. 4.



Witnesses

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Geo. H. Strong

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UNITED STATES PATENT OFFICE.

JOHN I. TAY, OF OAKLAND, CALIFORNIA.

STAIRWAY-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 227,459, dated May 11, 1880.

Application filed March 11, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN I. TAY, of Oakland, county of Alameda, and State of California, have invented a Stairway-Elevator; and I hereby declare the following to be a full, clear, and exact description thereof.

The object of my invention is to provide a means by which persons may readily ascend or descend from one story of a house to another with slight exertion of muscular power and without the use of steps or stairs or elevators worked by air, steam, or water.

It consists in placing at one side of the staircase, in convenient position, a small tramway, upon which travels a light peculiarly-constructed car, so arranged and connected by cords with weights that a person stepping upon the car may, by turning hand-wheels at little expenditure of power, propel the car up or down, as the case may be.

Suitable arrangements are made for properly counterbalancing the car, for drawing it either up or down empty to the position of the person desiring to use it, and for the application of a brake for the prevention of accidents.

It further consists of certain details of construction, as is more fully described in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of my invention. Fig. 2 is a front view. Fig. 3 shows the hoisting apparatus. Fig. 4 is a modification.

Let A represent an ordinary flight of steps, such as are used in dwellings; and B, the rails or tramway, placed at one side of the staircase, and having a landing at the upper platform, as shown. This tramway may be made in any desired manner, and may be ornamental in form, but so arranged that a weight on rollers may slide up and down between the rails and pass the car, as hereinafter described.

The rails may be covered with gutta-percha, if desired, to insure noiselessness, and to give the rollers a gripe, so the hand-wheel could control them in case the rope should break.

The car C runs on four rollers or wheels, *c*, the lower pair of which are larger than the upper, to account for the angle on which it runs. The car itself is made preferably in three steps, across the center of one of which is a band, *c'*, connecting with the axle of the large hand-

wheels D, as shown. These hand-wheels D have friction-rollers *d* upon them, and when the band *c'* is depressed by the person stepping upon it these friction-rollers *d* are brought down in contact with the edges of the wheels *c*; then by rotating the hand-wheels motion is imparted by friction to the rollers or wheels *c* to move the car up or down.

The rollers *c d* may, if desired, be geared together; but I prefer to operate them as friction-rollers, as described.

The band *c'* connects with the center step, on which the person stands, and the additional weight of the person on this band brings the friction-wheels *d* down upon the rollers *c*, so that said rollers *c d* will be in close contact. The car itself, when of metal, would spring enough to let the rollers *c d* come in contact. If of wood, however, boxes with rollers in them could be made for the axles of the hand-wheels D, so the weight of the person standing on the band would bring them down to accomplish the same object.

The car is counterbalanced by a weight, E, and cord *e'*, this weight accounting for the car when loaded. The cord passes over a friction-roller, F, at the top of the staircase, then through an eye or sheave, *g*, in the weighted brake-block G, and then over the large pulley H. On the same shaft as this large pulley H is a smaller pulley, H', on which is the cord *e'*, carrying the weight, as shown.

The weight *g'* on the brake-block has a slot and screw, so as to be adjustable to or from the pivot of said block, in order that the pressure of the brake on the pulleys H H' may be in accordance with the loads to be carried. It may be set to exert any desired pressure, and once set need not be moved again. It may be adjusted so that the weight of a grown person will operate the brake, but that of a child will not. A child could not therefore use the car, since it could not overcome the friction of the brake.

The eyebolts *g* may be arranged to be moved back and forth on the brake-block G, and would accomplish the same object in adjusting the brake, since the ropes or cords pass through these eyebolts, as described.

The brake-block G is hung on a pivot, and

is weighted, so as to be always in contact with the pulleys H H', except when raised by the lever I and cord *i*, this cord leading through eyes to the foot of the staircase and along the line of track, so it may be grasped at any time by the occupant of the car.

The cord *e* connects the car and pulley H by passing through the sheave in the eye *g* in the brake. When a strain is put on the cord it lifts the brake from the pulley and allows the car to move in either direction. If, however, it moves too fast, by drawing on the cord *i* the lever I throws the brake on again. In this way the speed of descent may be graduated to a nicety. The speed can also be regulated by the hand-wheels, the car being counterbalanced, as described. Even if the cord should break, the movement of the car could be controlled by the hand-wheels.

The pulley H', carrying the cord and weight, is smaller than the pulley H, on which is wound the cord connecting with the car. The weight is heavy enough to counterbalance the car, and at the same time allow a greater length of travel to the car than to the weight.

At the foot of the stairs are pulleys J J, around which passes an endless rope, *j*. On the shaft of the upper roller is a cord, K, which leads over the friction-roller at the top of the stairs, and has its end attached in an eye in the brake-block, so as to trip said brake when a strain is brought on the line. A small weight, K', is intended for taking up the slack of this cord K at all times, and is put on a cord on a smaller pulley on the same shaft which carries the pulley for said rope or cord K.

In case the car should be at the top of the stairs and be wanted below, the person wanting it rotates the rollers J J by the endless rope *j*. This winds up the rope K, lifting the brake and the weight E, and the car comes down to the bottom. If the car is at the bottom and the person at the top, he lifts the brake-block by depressing the brake-lever by means of its rod I'. By pushing down on this rod I' the brake is released from the pulleys H H', and the weight, being up, begins to descend and draws the car up.

In connection with this device I employ a water-tank, N, placed at the top of the stairs, provided with a ball-valve connected with a supply-pipe. An exit-pipe, *n*, has a sliding or telescopic extension, *n'*, which is connected in any suitable manner with a cock to let the water flow from the tank when the extension *n'* is slid up the pipe or by contact with the weight.

The weight may be made hollow, and as it comes to the top and comes in contact with the extension *n'*, water flows from the tank into the hollow weight. This gives an excess of weight, which will draw the car up without even moving the hand-rollers. All the person then has to do is to draw on the cord regulating the brake-lever and brake, and the water-filled weight will draw the car up.

When the weight reaches its lowest point after drawing the car up, a valve in the bottom discharges the water. This will only be used in those cases where one desires to come up stairs in the car without exercising any exertion at all on the hand-wheel.

This arrangement, as described, is particularly adapted to such stairs as are winding; but for straight staircases a more simple arrangement is used, as shown in Fig. 4. In this, the car-track, &c., are the same, but a different weight is provided. This weight L has four rollers and rolls up and down between the rails. A cord, *e*, attached to it, passes under the roller F at the top of the flight, and, being carried over, is secured to the car. The end is not attached direct to the weight-carriage L, but to an adjustable cam or pawl, M, which is so balanced as to engage with the ratchet or slots *m* between the rails, except when the strain on the cord *e* keeps it straight. This weight counterbalances the loaded car.

When the car comes up steadily and a steady strain is kept on the cord the weight will move smoothly down without the pawl or cam catching in the slots. Any irregularity of movement, however, will cause the pawl to engage and the car to stop. As the operator in the car can control the movement of said car he can cause the cam or pawl to engage at any time and stop the car.

The adjustability of the pawl is accomplished by the holes *m' m'*, of which there are several. When the cord is fastened in the outer one the pawl is easily lifted by a slight weight or strain on the cord. When the cord is fastened nearer the pivot of the pawl the pawl is not so easily lifted, a greater weight being necessary to bring it in line with its rolling weight and keep it out of engagement with the slots. This pawl is thus adjustable to the weight to be carried.

The pawl is adjusted to the weight which the car is required to carry, the car itself not being of sufficient weight to raise the pawl. When set for any specified weight the pawl will not rise unless this weight comes in the car. Therefore, when adjusted for grown persons, children could not move the car, since the pawl would not be lifted out of the slot, and the car would not be counterbalanced if moved up when the weight was held by the pawl being in a slot.

The cord K, connected with the endless rope *j*, can be used with this rolling weight by being taken over the friction-roller at the top of the stairs and hooked onto the adjustable cam or pawl. Then the pawl can be lifted so the weight will be free to slide. In this way the car can be either drawn up or down to the position of the person requiring its use.

I make my car in three steps, because it is the most natural way to use it. The person steps upon the lower step and then onto the second one, where he stands while the car is in motion. On arriving at the top he steps

onto the upper step, and is then on a level with the landing. While standing on the center step he is in proper position to work the hand-wheels readily.

5 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

10 1. An apparatus for ascending and descending stairways, consisting of the inclined tramway B, with the car C, said car, when loaded, being counterbalanced by weights and cords, and adapted to be moved on the tramway by means of hand-wheels, substantially as and for the purpose herein described.

15 2. The car C, in two or more steps, provided with wheels or rollers *c*, and hand-wheels D, having friction-rollers *d*, in combination with the counterbalance-weight E and cord *e*, said cord being led through the eyes *g* 20 in the weighted brake-block G, whereby the car may be moved up or down with slight exertion, and the strain on the cord *e* lifts the brake-block from the pulleys H H', substantially as and for the purpose herein described.

25 3. In combination with the car C, provided with the rollers or wheels *c*, the band *c'*, carrying the hand-wheels D, with their rollers *d*, whereby the action of stepping on the car brings the hand-wheels and rollers in contact 30 so the car may be moved, substantially as and for the purpose herein described.

4. In combination with the car C and weight E, connected by the cord *e*, the adjustable brake-block G, with its sheave *g*, and the pulleys H H', whereby the brake is automatically 35 removed from the pulleys when a weight is put on the car and strain brought on the cord *e*, substantially as and for the purpose herein described.

40 5. In combination with the car C and weight E, connected by the cords *e e'*, leading through the eyes *g* to the pulleys H H', the adjustable brake-block G, provided with the lever I, rod I', and cord *i*, whereby the brake is brought into 45 action and the motion of the car regulated, substantially as herein described.

6. In combination with the brake-block G, provided with the sheaves *g*, through which pass the cords *e K*, the adjustable weight *g'*, 50 whereby the brake may be set to exert any desired pressure, substantially as herein described.

7. In combination with the weight E, brake-block G, with its levers, and the car C, said car being connected with the weight by the cord *e*, leading to the pulleys H H', through the brake-block sheave *g*, the cord K, pulleys J J, and rope *j*, with the take-up weight K', whereby the brake-block may be lifted from the pulleys and the car brought up or down 60 to the person needing it, substantially as herein described.

8. In combination with the hollow weight E, provided with a valve and adapted to draw a car up an incline, as described, the water-tank N, with its exit-pipe *n* and telescopic extension *n'*, controlling the cock, whereby additional weight may be automatically supplied to the counterbalancing-weight to draw up the car without muscular exertion, substantially 70 as and for the purpose herein described.

9. In combination with the car C, adapted to move on an inclined tramway and provided with hand-wheels D and friction-rollers *c d*, the rolling counterbalance-weight L, provided with wheels, connecting-cord *e*, and an adjustable pawl, M, arranged to engage with the slots *m* between the rails, substantially as 75 and for the purpose herein described.

10. In combination with the rolling counterbalance-weight L, connected by the rope *e* with the car C, adapted to move on an inclined tramway, the pawl or cam M, adapted to engage with the slots *m*, and provided with the holes *m' m'*, whereby the pawl is adjusted to 80 the weight to be carried, substantially as herein described.

11. In combination with the weight L, connected with the car C of an inclined tramway by the rope *e*, said weight being provided with an adjustable cam, M, with its holes *m' m'*, and adapted to engage with the slots *m*, the cord K, pulleys J J, endless rope *j*, and take-up weight K', whereby the pawl is controlled independent of the car, so as to bring the car 95 to the position required, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN I. TAY.

Witnesses:

CHAS. G. YALE,
S. H. NOURSE.